REMARKS

Claims 1 and 2 are pending in the application. Claim 1 stands rejected. Claim 2 would be allowable if placed into independent form. Applicants so amend claim 2.

Claim Rejections - 35 U.S.C. §103

Claims 1 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Hoshiba (6,102,755) in view of Graham et al (6,587,765).

The invention is particularly concerned with a method and apparatus for controlling the outboard engine of a boat. In such environment, a stalling problem arises when the boat is switched from a forward mode to a reverse mode by operation of a shift lever, due to a large load applied to the engine when attempting to stop the vessel. Several control units are involved.

As explained with respect to Fig. 1, an operational lever used by the operator acts as a remote control device 1 and comprises a throttle lever integrated with a shift lever. The lever provides an input to **remote control device control unit 3**, which calculates a target shift position and a target throttle opening degree and outputs data onto a communication line 4. A throttle **actuator control unit 5** and shift actuator control unit 6 are responsive to signals on line 4 in accordance an algorithm illustrated in Fig. 2. The throttle actuator control 5 receives information of a degree of throttle actuator openings (7) and provides a control signal (8) to drive the throttle actuator 11 to open or close the throttle.

The **shift actuator control unit 6** similarly receives shift actuator position information (9) and provides a control signal (10) to drive the shift actuator 12. The shift actuator 12 actuates shifting according to a target shift position received as the control signal.

Operation of the throttle actuator control unit 5, as illustrated in Fig. 2, begins with reception of a target throttle opening degree RefThl (S2), the target shift position (S3) and a current shift position (S4). The existence of a shift-in target shift position is determined (S5) as is a "shift-in" (switching from neutral to reverse or forward). This determines use of a correction value at shift connection as subsequently explained.

The key event is when the target shift position equals the current shift position (S8). If so, the throttle actuator target opening degree is made equal to the reference value (S13) and the throttle actuator is driven (S14). If this equality does not exist and a compensation is required, the throttle actuator target opening degree is made equal to zero if the target position is not in the shift-in position (S10) or is equal to K if the target shift position is in the shift-in position (S11).

As a result, the load caused by the rotational axis of the propeller at the time of the shift connection is taken into account and engine stalling is avoided. That is, when the target shift position is for the shift-in (neutral to reverse or neutral to forward) operation, the shift connection is conducted after the throttle actuator is driven to slightly open the throttle. This provides power to resist rotation of the drive axis. Moreover, since the throttle is already opened at the time of the shift connection, the opening operation of the throttle after shift connection is rapid. Thus, when it is determined that the target shift position is for "shift-in", the connection is conducted after the throttle actuator is driven to slightly open the throttle. Moreover, since the throttle is already open at the time of shift connection, the opening operation of the throttle after the shift connection becomes rapid.

These features are represented in claim 1, which specifically requires several means, including a ***target value calculating means*** for calculating a target throttle opening degree and a target shift position based on an inputted position of an operational lever. The claim also requires a ***correction throttle opening degree setting means*** for setting a predetermined throttle opening degree so as to put the throttle into a small opening degree state, when the target shift position is in the shift-in state, defined as neutral-reverse or neutral-forward with this construction. A ***control means*** drives the shift actuator to conduct shift connection after driving the throttle actuator to put the throttle into the small opening degree state in which the throttle is opened by the predetermined throttle opening degree.

Prior Art

The Examiner again observes that Hoshiba concerns a control drive apparatus for an outboard engine and asserts that with respect to Fig. 1, the reference teaches:

the ***control means***, comprising single lever control mechanism 65 with lever 67,

the ***target value calculating means*** corresponding to the ECU 59, which uses an inputted position of the lever 67,

the ***throttle actuator*** corresponding to the servo motor 73 that opens and closes a throttle valve 46 in accordance with a signal from the ECU to specify the target throttle opening degree.

The Examiner admits that Hoshiba does not disclose that the ECU calculates a target shift position based upon the inputted position of the lever and a shift actuator (shift cam 71 coupled to dog clutching element 27) that actuates a shift in accordance with the target shift position.

The Examiner notes that Hoshiba uses a mechanical linkage between lever 67, cable 68, shift rod 69 and shift cam 71. The Examiner asserts that it is well known for both the throttle and shift control to be "fly by wire" as in the throttle control of Hoshiba. The Examiner asserts that it would have been obvious to replace the mechanical linkage of Hoshiba with an electronic control based on the teachings of Graham. The result would be that the Hoshiba ECU would calculate a target throttle opening degree and a target shift position based upon an inputted position of the lever, and that of a throttle actuator.

The Examiner now asserts that the ***determination means*** for determining whether or not the target shift in position is in the "shift in state" is asserted to be the control lever position sensor 72 and ECU 59 (previously asserted to be the shift control mechanism sensor 79 and shifting sensor 83, which is coupled to the dog clutching element).

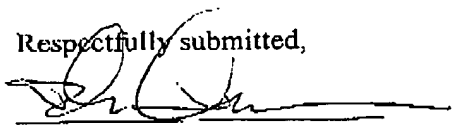
The Examiner now asserts that the ***correction throttle opening degree setting means*** is the algorithm of the ECU, particularly where it increases the engine speed above idle. The Examiner notes that the claim recites that the throttle is opened when the target shift position is in the shift in state, not as a result of the determination means determining that the target shift position is in the shift-in state. Applicants have therefore amended claim 1 to exchange the underscored words and improve clarity. As a result, Hoshiba and Graham are believed to be further distinguished.

Further with respect to the setting means, the Examiner admits that Hoshiba does not disclose that the throttle is opened by a predetermined throttle opening degree. The Examiner notes that the Hoshiba ECU is a programmed controller and thus deals with discrete values that must be "predetermined." Applicants submit that the term "predetermined" indicates a value that has been set beforehand, as by a look up table or the like. The specification at page 7, lines 19-23 clearly indicate that the value is set at the time of designing or manufacture. Hoshiba does not disclose this feature, and indeed does not disclose throttle opening at all at the timing and in the manner claimed.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Richard C. Turner
Registration No. 29,710

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: April 14, 2005